NOAA Technical Memorandum NMFS-SEFSC-474

REPORT OF THE WORKSHOP TO REVIEW CURRENT KNOWLEDGE OF THE STATUS OF HUMPBACK WHALES (*Megaptera novaeangliae*) IN THE EASTERN CARIBBEAN AND TO DISCUSS, PLAN, AND COORDINATE FUTURE RESEARCH

Steven L. Swartz
NOAA Fisheries Southeast Fisheries Science Center
Protected Species and Biodiversity Branch
75 Virginia Beach Drive
Miami, Florida 33149

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Fisheries
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149

August 2001

NOAA Technical Memorandum NMFS-SEFSC-474

REPORT OF THE WORKSHOP TO REVIEW CURRENT KNOWLEDGE OF THE STATUS OF HUMPBACK WHALES (*Megaptera novaeangliae*) IN THE EASTERN CARIBBEAN AND TO DISCUSS, PLAN, AND COORDINATE FUTURE RESEARCH

Steven L. Swartz
NOAA Fisheries Southeast Fisheries Science Center
Protected Species and Biodiversity Branch
75 Virginia Beach Drive
Miami, Florida 33149

U.S. DEPARTMENT OF COMMERCE
Donald L. Evans, Secretary

National Oceanic and Atmospheric Administration
Scott B. Gudes, Acting Under Secretary for Oceans and Atmosphere

NOAA Fisheries
William T. Hogarth, Acting Assistant Administrator for Fisheries

August 2001

NOTICE

NOAA Fisheries does not approve, recommend or endorse any proprietary product of material mentioned in this publication. No reference shall be made to NOAA Fisheries or to this publication furnished by NOAA Fisheries, in any advertising or sales promotion which would imply the NOAA Fisheries approves, recommends, or endorses any proprietary product or proprietary material mentioned herein or which has as its purpose any intent to cause directly or indirectly the advertised product to be used or purchased because of this NOAA Fisheries publication.

This report should be cited as follows:

Swartz, S.L., 2001. Report of the workshop to review current knowledge of the status of humpback whales (*Megaptera novaeangliae*) in the eastern Caribbean and to discuss, plan, and coordinate future research. NOAA Technical Memorandum NMFS-SEFSC-00-00. 13 pp.

This report has an internal document number PRD-00/01-16

Copies may be obtained by writing:

Director, Protected Resources Branch
Southeast Fisheries Science Center
NOAA Fisheries
75 Virginia Beach Drive
Miami, FL 33149

or

National Technical Information Center
5825 Port Royal Road
Springfield, VA 22161
(703) 605-6000, FAX (703) 605-6900
Rush Orders: (800) 553-6847

Summary

The United States National Marine Fisheries Service's (NOAA Fisheries), Southeast Fisheries Science Center (SEFSC) convened a workshop from 9-11 January 2001 in Miami, Florida to discuss the general issue of the current status of humpback whale that winter in the Eastern Caribbean. The objectives of the workshop included: 1) review of the findings of surveys for humpback whales conducted in 2000 in the Eastern Caribbean; 2) discuss plans for future surveys and how best to coordinate them among interested parties; and 3) encourage participation by International Whaling Commission (IWC) and IOCARIBE member nations to foster cooperative research among the Eastern Caribbean nations who share interest in the status of humpback whales in the region. The workshop was attended by 24 scientists and fisheries managers with broad expertise in whale survey methods and the current state of information concerning cetaceans in the Eastern Caribbean.

Report of the Workshop To Review Current Knowledge of the Status of Humpback Whales (*Megaptera novaeangliae*) in the Eastern Caribbean and to Discuss, Plan and Coordinate Future Research

9-11 January 2001
NOAA Fisheries' Southeast Fisheries Science Center
Miami, Florida 33149 U.S.A.

1. Election of Chair:

The workshop participants were welcomed by the convener, Swartz, who also served as the Chairman of the Intersessional Steering Committee for the Workshop. Swartz was elected workshop Chairman.

2. Adoption of the Agenda:

The draft agenda developed by the Intersessional Steering committee was adopted as shown in Appendix 1.

3. Workshop Objectives:

The United States National Marine Fisheries Service's (NOAA Fisheries), Southeast Fisheries Science Center (SEFSC) convened a workshop from 9-11 January 2001 in Miami, Florida to discuss the general issue of the current status of humpback whale that winter in the Eastern Caribbean. The objectives of the workshop included: 1) review of the findings of surveys for humpback whales conducted in 2000 in the Eastern Caribbean; 2) discuss plans for future surveys and how best to coordinate them among interested parties; and 3) encourage participation by International Whaling Commission (IWC) and IOCARIBE member nations to foster cooperative research among the Eastern Caribbean nations who share interest in the status of humpback whales in the region. The workshop was attended by 24 scientists and fisheries managers with broad expertise in whale survey methods and the current state of information concerning cetaceans in the Eastern Caribbean (Appendix 2)

4. Appointment of Rapporteurs:

Litz, Carlson, and Swartz rapporteured the discussions with others assisting as required.

5. Review of Available Documents:

A number of papers were submitted to the workshop in response to a request from the intersessional steering committee. These papers were considered under the appropriate agenda topics. In addition, a number of participants presented "Power Point" oral discussions that provided information relevant to the objectives of the workshop and the discussions for each agenda topic (Appendix 3 and 4).

6. Review of Historical Whaling Information for Humpbacks in the Eastern Caribbean:

North Atlantic humpback whales wintering in the eastern Caribbean were hunted to economic depletion by Yankee, Norwegian, and local whalers (e.g., Trinidad shore stations) between the 1830's and 1920s. Recent surveys report only few humpback whales in areas in which they were once plentiful, and areas in the northeastern Caribbean currently host concentrations where they were not known to exist historically (i.e., Silver and Navidad Banks off the northeast coast of the Dominican Republic). Apparently humpback whales have shifted their preferred wintering grounds to more northerly areas, and/or these whales once extirpated in the eastern and southern Caribbean have failed to recover to their historical abundances. In winter some portion of the humpback population migrates to the West Indies, and specifically the Greater and Lesser Antilles. However, results of research in the northern Caribbean accounts for only a fraction of the North Atlantic humpback population, suggesting that some humpbacks distribute themselves elsewhere within the Caribbean during the winter months. The International Whaling Commission expressed its desire for current information on humpback whales in this region for its upcoming Comprehensive Assessment of North Atlantic humpback whales.

Swartz reviewed the information presented in Reeves et al. 2000, Reeves et al. 2001, and Mitchell and Reeves 1983 concerning the historical distribution of humpback whales in the Eastern Caribbean based on historical whaling logbook records. The distribution of sightings and records of humpback whales taken suggest that these animals ranged throughout the Eastern Caribbean and that whales moved long distances and crossed deep basins to visit coastal wintering areas (Fig. 1). The nineteenth century American whalers hunted humpbacks in the Windward Islands (primarily from Guadeloupe southwards), along the coast of Trinidad, in the Gulf of Paria and westwards along the Venezuela coast. There is no evidence that humpbacks were taken on a more than casual basis in waters off Hispaniola and Puerto Rico where they congregate in large numbers today.

7. **Review of current information on the occurrence of humpback whales in the Eastern Caribbean by country.**

7.1 DOMINICAN REPUBLIC: Ramirez summarized the humpback whale conservation program developed by the Center for Conservation and Eco-Development of Samana Bay and its Surroundings (CEBSE). The mission of the project is to foster sustainable development of whale-watching in the Samana Bay region off the northeastern coast of the Dominican Republic. The area has been proposed as a bio-sphere reserve and co-management strategies to conserve natural resources (including whale-watching) have been implemented. A research program was initiated in 1999 to collect data on the levels and methods of whale watching that occur during the winter in Samana Bay. This information will be used to manage whale watching in a sustainable manner over time. Information collected on the humpback whales includes group sizes, age-sex composition of groups, distribution and movements, and behavior of the whales. February, March and April are the times humpback whales are in Dominican waters. Ramirez noted that the largest concentrations of humpback whales occur on the Silver and Navidad Banks located off the northeast coast of the Dominican Republic. There the whales interact with fishing boats and there is concern that there may be some detramental effects. Some limited whale-watching activity also occurs there within an established sanctuary or protected area, but a t a much lower level than at Samana Bay due to the distance of these banks from the mainland shore.

7.2 PUERTO RICO: Mora-Pinto summarized the information on the occurrence of humpback whales around Puerto Rico, much of which was obtained during the 1980's by independent researchers and the collective YoNAH (Year of the Humpback Whale) international humpback survey project. Most humpback sightings come from the northwest end of the island and in the Mona Passage near Desecheo and Mono Islands. Sightings generally begin in November and increase to peaks in February and March, afterwords they decline and few whales are seen after April. Mora-Pinto and colleagues are proposing a new project that will seek to obtain information on humpbacks that winter around Puerto Rico including: habitat use and preference; age/sex classes of whales; group associations; acoustic song analysis; stock identity; and response to vessels as observed from four land-based observation points. Whale-watching is not a big industry in Puerto Rico, however the government is developing guidelines to manage the industry in the event that it grows.

7.3 VIRGIN ISLANDS: Kojis summarized information on the occurrence of humpback whales in the Virgin Islands. Previous research conducted in 1985-1986 suggested that the peak humpback whale abundance in the Virgin Islands occurs in March, however sightings of whales occur from January through March. There are very few whale watching enterprises, however, whale sighting forms are distributed through a sightings network and have been summarized since 1972. Female-calf pairs are frequently seen along with other humpbacks (e.g., singles, groups, etc.). There is a need for additional research on the use of the Virgin Islands area by humpback whales and the Virgin Islands expressed an interest in participating in future research.

7.4 TURKS AND CAICOS: Fulford-Gardiner, Vanderlind, and Higgs presented information on the occurrence of humpback whales around the Turks and Caicos. This area is a popular location for tourists seeking to scuba dive on the extensive coral reefs. The water is exceptionally clear and the marine life is very rich. In the winter months of November to April humpback whales visit the area and whale watching programs operate during this period. Whale watchers are allowed to snorkel in areas visited by the whales, but the whales are not pursued. The whales must come to the snorkelers, and they frequently

do. Salt Key near Grand Turk and Mouchoir Banks are areas where whale watching occurs. The Turks and Caicos sponsored a Whale Watching Conference in March 2000 designed to aid in the development of a sustainable whale watching industry. The government wishes to promote tourism, including whale watching, while conserving natural marine living resources, including whales. The Turks and Caicos wishes to initiate a research program that will better define the use of their waters by humpback whales. Better information is needed on the winter distribution, abundance, and behavior of humpback whales in this region. There is a concern for entanglement of humpback whales in fishing gear, as whales carrying lines and nets are sometimes seen. There is also a concern that legal and illegal fishing on the Banks may be disturbing the whales and affecting their use of these areas. However, better data on the whales' use of these areas is needed.

7.5 ANTIGUA AND BARBUDA: No information was available to the workshop for Antigua and Barbuda.

7.6 ST. KITTS AND NEVIS: Simmonds presented information on the seasonal occurrence of humpback whales around St. Kitts and Nevis. Most information comes from fishermen and divers working in the area. Humpback whales are sighted from December to April each year. Most whales are seen in pairs or groups, including mother-calf pairs. St. Kitts and Nevis is trying to develop the capacity to conduct research on the whales. He noted that the recently formed Eastern Caribbean Cetacean Organization (ECCO) will promote research on cetaceans in the region (See section 9).

7.7 GUADELOUPE: While there were no representatives from Guadeloupe at the workshop, Carlson reported that humpback whales are seen there from as early as December until May, with the peak of sightings occurring in March.

7.8 DOMINICA: No representative from Dominica attended the workshop, however Lawrence reported that Dominica conducted a whale sighting survey in 2000 in tandem with St. Vincent and St. Lucia. The sighting survey reported one possible sighting of a humpback whale. Opportunistic sightings from 1988-1992 included an average of two humpback sightings per year from November to April. Common species seen included sperm whales, and small cetaceans (e.g., dolphins and pilot whales). There is a growing whale watching industry which sometimes encounters humpback whales. Dominica will continue its research on cetaceans under ECCO with other islands, and the Fisheries Department has set up a system to collect information on whale watching boats operating in Dominican waters, and observers may accompany these trips on request. The establishment of some shore-based whale watching stations is being discussed.

7.9 MARTINIQUE: There was no information available to the workshop for Martinique.

7.10 ST. LUCIA: Rambally reported on the results of a sighting survey conducted by the St. Lucia Department of Fisheries from 14-18 February 2000 in collaboration with the Institute of Cetacean Research (ICR) of Japan. The sighting survey was conducted along the west coast of St. Lucia within the 12-mile territorial sea. The objectives of the survey were to: 1) obtain information on the distribution and abundance of cetaceans in St. Lucia's territorial sea, 2) to take photographic data and recordings of sounds for acoustic studies, and 3) to determine vernacular names use for local cetaceans. A 14 ton, 35 foot Bertram sports fishing/whale watching vessel with a lookout tower was used as the survey vessel. The survey used the line transect method endorsed by the International Whaling Commission's (IWC) Scientific Committee, and searching was carried out by following the procedure, protocol and sighting forms used in the IWC/SOWER cruises. For the first two days, tracklines were set within the twelve mile limit, the following days tracklines were set within the six mile limit. Data collected included cetacean species, pod size, estimated radial distance from the vessel, sighting angle, sightng cue, date and time (local), position (GPS) and weather conditions. A total of 15 nautical miles of track line were surveyed along the west coast of St. Lucia. Two sightings of pilot whales and three sperm whales were sighted. The survey corresponded with the presence of a high pressure system that made the sighting conditions poor, and likely accounted for the few number of cetacean sightings. Future surveys are planned for the same time period in following years.

7.11 ST. VINCENT AND THE GRENADINES: Ryan summarized the findings of a sighting survey conducted by the Fisheries Division in coastal waters of St. Vincent and the Grenadines from 7-11 March 2000 in collaboration with Japanese scientists. A small multi-purpose research vessel was used for the survey. The vessel followed predetermined tracklines demarcated within 6 nautical miles off the west coast of St. Vincent and the east and west coasts of the northern Grenadines. A total of 133.4 nautical miles of transect lines were followed during the survey at an average speed of 8-9 knots. Two to three researchers conducted visual searches for whales. No large whales (e.g., humpbacks) were observed, however, four sightings of dolphins were made. St. Vincent hopes to conduct additional surveys of their coastal waters in winter-spring 2001.

7.12 GRENADA: There was no information available to the workshop from Grenada. Swartz noted under item 7.19 that humpback whales, including a mother-calf pair were detected around Grenada during the recent IOCARIBE sponsored survey, and that Grenada has a history of shore whaling for humpback, sperm, and pilot whales. The International Whaling Commission's Scientific Committee held its annual meeting in Grenada in 1999 and it was learned that humpback whales were frequently observed around Grenada during the winter months of February and March.

7.13 BARBADOS: There was no information available to the workshop from Barbados. Swartz noted in item 7.19 that the 2000 IOCARIBE sponsored survey acoustically detected humpback whales around Barbados in February and in March and that some of these detections were confirmed visually.

7.14 TRINIDAD: Tam reported that humpback whales are seen around Trinidad in January to March, with February-March being the period of most abundance. There are very few records of humpbacks in the literature and historical accounts. Shore-based whaling stations operated in the Gulf of Paria in the 1800's and it is believed from the descriptions of the animals harvested that they took primarily humpback whales. In March 2000 the International Fund for Animal Welfare (IFAW) conducted some acoustic surveys around Trinidad and Tobago, and another survey in February-March 2000 sponsored by IOCARIBE on the NOAA RV Gordon Gunter also conducted sighting and acoustic surveys for humpback whales in these waters. Both these surveys detected humpback whales acoustically and visually along the north, northeast, and eastern shores of Trinidad. A juvenile humpback whales was reported to have stranded off the east shore of Trinidad in August 2000, but the species was never confirmed. No humpback whales have been reported off the southern or western coasts, the Serpents Mouth and Gulf of Paria, respectively. These areas presently have many oil and gas production platforms and commercial vessel traffic. The disturbance form these activities may affect the whales' use of these areas, but research on the levels of noise need to be conducted along with more extensive acoustic monitoring. Trinidad would like to establish an acoustic monitoring station along its coasts to detect the seasonal occurrence of humpback and other cetaceans.

7.15 TOBAGO: Holmes summarized information on the seasonal occurrence of humpback whales off Tobago. The Marine Resources and Fisheries Department of Tobago receives reports from fishermen and boaters of humpback whales in the area, but there is no means to validate these reports. In 2000 IFAW initiated an education program in the local schools to increase the awareness of whales in the waters around Tobago. Tobago is eager to obtain guidance and assistance to establish a formal whale sighting and reporting program, and to participate in research cruises for cetaceans.

7.16 VENEZUELA: Bolanos reported that there has not been any systematic research program for cetaceans in Venezuela. Opportunistic sightings and information from some strandings have been gathered during the past ten years. Apart from a few sightings reported by Naviera and Diez (1996) and Winn and Winn (1978) during February and March, it was not believed that humpback whales frequent the northern shores of Venezuela in any great numbers in the winter. The recent IOCARIBE sponsored acoustic and visual survey reported by Swartz (See Sec. 7.19) acoustically and visually detected humpback whales and other species off the north coast of Venezuela in March 2000. In addition, two historical strandings of a male humpback whale in October 1994 (Naviera and Diaz 1996) and of a 6.3m male in May 1990 (Boher and Garcia 1989) along the northern coast of Venezuela suggest that some southern hemisphere humpbacks may visit these waters during the austral winter, or that some humpbacks may be resident in this region. Agencies in Venezuela that are interested in participating in future research on

cetaceans include the Universidad Central de Venezuela, and the Fundacion Museo de Mar, Museuo de Marguarita Island.

7.17 COLUMBIA: There was no information from Columbia available to the workshop.

7.18 BRAZIL: Moreta described the occurrence of southern Atlantic humpback whales off the eastern coast of Brazil and a research program that is gathering information on the whales that occupy the Abrolhos Bank during the austral winter. From July to November humpback whales occupy the waters around five small islands on the bank. A photographic identification and genetics study are part of the program to determine the relationship between these whales and those that summer in the Antarctic. Land based observations gather data on the whales interactions with whale-watching boats that visit the area, and gather statistics on the numbers of whales and whale-watching vessels that occur throughout the season. Dedicated vessel surveys are also used to document the distribution of humpback whales throughout the Abrolhos Bank area. Another component of the program is gathering recordings of male humpback whale song to examine specific aspects of the song structure for possible correlation with stock structure within the population. Moreta noted that many aspects of this research program for Brazillian humpbacks could be applied to the study of north Atlantic humpbacks that winter in the Eastern Caribbean.

7.19 2000 IOCARIBE SURVEY: Swartz reviewed the findings of the 2000 IOCARIBE sponsored multi-national survey to assess the current status of humpback whales in the southern and eastern Caribbean was conducted February-April 2000 (Swartz et al. 2000). Scientists from several Caribbean nations, Brazil, and the United States conducted this multi-national survey for humpback whales which utilized state-of-the-art passive acoustic methods to augment standard visual based surveys and confirmed the presence of humpback whales in areas where they were previously exploited to economic depletion. The survey confirmed the presence of humpback whales during February and March throughout their former range from St. Kitts and Nevis south along the southern Greater Antilles and the Lesser Antilles including Barbados, Trinidad-Tobago, and along the northern coast of Venezuela. A total of 74 acoustic detections of singing humpback whales (presumed to be males) was obtained from approximately 350 hr of acoustic monitoring throughout the survey area. On-effort visual sightings were few (n=9) suggesting that visual methods alone underestimate the number of humpbacks. It was suggested that future such surveys should be designed to complement coastal surveys conducted by smaller vessels to provide continuous coverage from the shore of islands out to deep water. The next phase of this research will need to: (1) concentrate on additional surveys of areas not covered by the first surveys to completely identify the winter range of humpback whales in this region; (2) collect additional genetic photographic samples from individual whales to determine relationship to the North Atlantic population; (3) further refine the acoustic methods used to detect humpback whales, and from this data, determine the seasonal abundance (i.e., regional density) of whales utilizing the eastern and southern Caribbean during the winter; and (4) characterize the marine habitats currently preferred by humpback whales to determine why there has been a shift in the whales' use of habitats since commercial whaling ceased in this region.

8. Future Research Needs and Methods:

The workshop participants noted that poor visibility conditions due to high winds have historically limited visual surveys for cetaceans in the Eastern Caribbean. Several recent cetacean research projects have begun to utilize passive acoustic listening devices to detect sperm and humpback whales as complements to sighting surveys. These acoustic methods for detecting and enumerating whales are developing rapidly and are becoming more common components of cetacean surveys.

Clark reported on the development of bottom mounted acoustic recording devices ("Pop-Ups") that may be used to obtain acoustic recordings of cetaceans for prolonged periods. These devices are placed on the seafloor and programmed to record for specific periods of time. At present, they can record for up to several weeks by programming specific recording schedules, and the goal is to develop devices that may record for up to 6-months. These recorders have been successfully used with several cetacean species and could complement vessel surveys by providing information on the seasonal presence of various cetacean species during prolonged periods when surveys are not being conducted.

Proni noted that hydrophones and hydrophone arrays mounted on the seafloor may also be useful for continuous monitoring of cetacean sounds, along with monitoring noise from vessel traffic and for obtaining measures of environmental sounds (e.g., rainfall, commercial shipping and seismic noise). Ambient noise may affect the selection of areas by whales, particularly if they are social animals that utilize sound to communicate, like humpbacks during the winter breeding season. It is possible that humpbacks select specific areas based on the levels of ambient noise that allow them to optimize their acoustic communications.

The Workshop participants noted the growth of whale watching programs throughout the Eastern Caribbean region, and they recognized that whale watching could adversely affects whales if measures were not taken to guide the development of these programs. They agreed that where possible, whale watching activities should also be monitored as part of cetacean survey programs to allow detection of any adverse affects of whale watching activities on cetaceans that are year round residents and on those species that occur only seasonally. The participants also noted that there are conflicts between fisheries and whale watching, particularly when it comes to vessel traffic and disturbance in areas where both activities occur at the same time and same seasons. As whale watching activities grow these user conflicts will need to be addressed, and research on whales could be helpful for identifying and managing these activities to minimize such conflicts.

The Workshop participants discussed plans for future surveys for cetaceans in their respective waters and regions. They noted that the IWC survey protocols should be utilized to standardize cetacean surveys and allow comparability of data among various areas. They also concluded that the core time period for such surveys should bracket the peak of the season for humpback whales when this species was the focus. Based on published information and information presented at the Workshop, the participants concluded that surveys for humpback whales should be conducted in February and March for local surveys. They further concluded that:

- Coastal Surveys should be conducted by small vessels in as many island areas as possible.

- Offshore survey should be conducted by a large vessel capable of surveying the offshore areas effectively and in coordination with the coastal survey efforts.

- Survey methods should be standardized and the IWC Scientific Committee protocol for survey designs should be utilized.

- Standard survey equipment and data gathered should include:
  GPS (Global Positioning System) for sighting locations and survey track line confirmation.
  Binoculars: 7x for coastal small vessel surveys, and 25x for offshore large vessel surveys.
  Depth measurements, sea surface temperature (SST), weather conditions (Beaufort Sea State) including visibility index.

Other activities that could be included in cetacean survey programs are:

- Photographic Identification
- Genetic sampling by biopsy collection.
- Analysis of humpback whale song for stock structure analyses.
- Shore stations for land based sightings.
- Long-term acoustic monitoring for seasonal presence and absence.
- Training of researchers in standardized methods and techniques by joint participation in research programs.

9. Research Collaboration and Coordination:

The Workshop participants agreed that international cooperation to encourage and promote cetacean research in the Eastern Caribbean was needed because no one nation could obtain sufficient data to characterize and monitor the seasonal distribution of humpback whales in this region. Interested nations should coordinate their research efforts and combine resources, as appropriate, to gain the maximum benefit of individual research programs in the region. To this end, the participants noted that many Eastern Caribbean nations planned to initiate and/or continue with whale sighting surveys in 2001 and beyond. Most of these efforts will be confined to nearshore waters around the islands due to the limited availability of ships capable of working in offshore waters. The workshop participants hoped that future survey programs would include large vessel surveys that would coordinate with and complement nearshore survey efforts to provide a complete picture of the distribution and movements of humpback whales in the region.

Walters noted that the Eastern Caribbean Cetacean Organization (ECCO) had recently been formed, and that its purpose was to coordinate cetacean research among member Caribbean nations. Swartz noted that the IWC Scientific Committee could also serve to encourage and coordinate research on all species of cetaceans in the region, as their objective is to maintain information on the current status of whale populations.

The workshop discussed and agreed that the following measures would assist with the development of a collaborative whale research and database building effort in the Eastern Caribbean. Their specific recommendations include:

9.1. Improve the survey coverage of all the island areas in the Eastern Caribbean to provide a more complete coverage of the region. Work with regional authorities to provide vessel clearances and approvals for collaborative surveys and related research on whales.

9.2. Include photographic identification (Photo-ID) efforts in the survey design.

9.3. Include biopsy collection for genetic analyses of stock identification. Identify regional laboratories that are capable and willing to process genetic material for stock identification studies.

9.4. Record humpback whale song for analysis of song structure and possible stock determination.

9.5. As possible, begin survey efforts early (e.g., December) and continue late (e.g., May) to document the first and last phases of the winter occupation of the region by humpback whales (i.e., the “tails”).

9.6. Establish land-based observation sites to document the presence of whales in specific locations.

9.7.Develop long-term acoustic monitoring for presence and absence of whale species, and to document ambient noise levels in various areas utilized by whales.

9.8. Develop and implement a common data-base and archive for sightings data from site specific sighting surveys. Access and contributions to this database would be available to all participating collaborators and their governments to improve scientific understanding and to guide management and conservation.

9.9. Provide training opportunities for all researchers to participate in regional surveys and to share new developments in methodology and survey techniques.

9.10. Identify regional contacts, focal points, and institutions for coordination of surveys.

9.11. Interface and collaborate, as possible, with regional whale-watching programs and stranding response programs to expand data gathering efforts.

The Workshop participants agreed that it would be useful to hold a post-field season meeting to review the accomplishments of each winter research and survey programs, and to plan coordination for the next season. For example, several nations will conduct winter surveys during February and March 2001. A

post-field season workshop to review the results of the winter field season and develop plans for the winter 2002 Field Season should be held during the summer of 2001. Perhaps this could be coordinated with the annual meeting of the IWC Scientific Committee, as many national representatives would be attending this meeting. Swartz suggested that this option should be discussed at next year's IWC Scientific committee meeting, as a means of coordinating the region wide research.

ACKNOWLEDGMENTS

The workshop participants thanked IOCARIBE, IWC and SEFSC for their support of the workshop and the NOAA Fisheries Southeast Fisheries Science Center for hosting the meeting at their Miami Laboratory.

Appendix 1.

Agenda For
Workshop To Review Current Knowledge of the Status of Humpback Whales in the Eastern Caribbean and to Discuss, Plan and Coordinate Future Research

9-11 January 2001
U.S. NOAA Fisheries Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida

1.0. Welcome and Introduction - Dr. Bradford Brown, Chairman of IOCARIBE

2.0. Logistic arrangements for the workshop - Brenda G. Smith & Steven Swartz

3.0. Election of Workshop Chair

4.0. Review and adoption of the workshop agenda

5.0. Review of historical whaling information for humpbacks in the Eastern Caribbean - Randy Reeves and Steven Swartz

6.0. Review of current information on the occurrence of humpback whales in the Eastern Caribbean (from north to south: months of arrival and departure, known distribution and relative abundance, and research and survey efforts completed and planned for the future):

- 6.1 Dominican Republic - Omar Ramirez Tejada
- 6.2 Puerto Rico - Diana Mora-Pinto
- 6.3 St. Thomas and the Virgin Islands - Barbara Kojis
- 6.4 Turk & Caicos Islands _ Michelle Fulford-Gardiner
- 6.5 Antigua & Barbuda - to be named
- 6.6 St. Kitts & Nevis - Joseph Simmonds
- 6.7 Guadeloupe - to be named
- 6.8 Dominica - Andrew Magloire
- 6.9 Martinique - to be named
- 6.10 St. Lucia - Jeannine Rambally
- 6.11 St. Vincent - Raymond Ryan
- 6.12 Grenada - to be named
- 6.13 Barbados - Patrick McConney
- 6.14 Trinidad -Analise Tam
- 6.15 Tobago - Arthur Potts
- 6.16 Venezuela - Jaime Bolanos
- 6.17 Columbia - Fabian Navarrete
- 6.18 Spring 2000 Gordon Gunter Eastern Caribbean vessel survey - Steven Swartz

7.0. Future research needs and methods

- 7.1 Bottom mounted automated acoustic recorders - Christopher Clark
- 7.2 Ambient noise measurements - John Proni
- 7.3 Vessel based visual and acoustic surveys
- 7.4 Other methodologies to assess humpback status - workshop group
- 7.5 Discussion of research needs

8.0. Research collaboration and coordination

- 8.1 Geographic coverage and gaps
- 8.2 Planned survey efforts and timetables
- 8.3 Recommendations for collaboration and coordination

9.0. Concluding remarks and adjournment - Workshop participants

Appendix 2. List of Participants

Name	Affiliation/Organization	Telephone
Jaime Bolanos	University Central, Venezuela	58-44-958477
Bradford Brown	NOAA Southeast Fisheries Science Center	305-361-4484
Carole Carlson	International Fund for Animal Welfare	508-487-0374
Chris Clark	Cornell University	607-254-2408
Anthony Martinez	NOAA Southeast Fisheries Science Center	305-361-4486
Michelle Fulford-Gardiner	Dept. Environmental and Coastal Resources, Turks and Caicos	649-946-2855
Everett Fret	Oasis Divers, T.B. Turks and Caicos	640-946-1128
Earle Higgs	Turks & Caicos Tourist Board	800-241-0824
Terrence Holmes	Marine Resources & Fisheries Tobago	868-639-0643
Barbara Kojis	Virgin Islands Division Of Fish and Wildlife	340-775-6762
Jenny Litz	NOAA Southeast Fisheries Science Center	305-361-4224
Nigel Lawrence	Eastern Caribbean Cetacean Organization	767-448-5562
Diana Maria Mora	University of Puerto Rico, Maguayez	787-899-7057
Maria E. Morete	Projecto Balero Jubarte, Caravelas, Brazil	55-73-297-1320
John Proni	NOAA Atlantic Oceanographic & Meterological Laboratory	305-361-4312
Jeannine Rambally	Department of Fisheries, St. Lucia	758-452-6172
Omar Ramirez Tejada	CEBSE, Samana Bay, Dominican Republic	809-482-6133
Raymond Ryan	Fisheries Division, St. Vincent	784-456-2738
Joe Simmonds	Fisheries Management Unit, St. Kitts and Nevis	869-465-8045
Jack Stamates	NOAA Atlantic Oceanographic & Meterological Laboratory	305-361-4317
Steven Swartz	NOAA Southeast Fisheries Science Center	305-361-4487
Analisa Tam	Trinidad, Institute of Marine Affairs	868-634-4292
Jennifer Vanderlind	Turks & Caicos Tourist Board	800-241-0824
Horace D. Walters	Eastern Caribbean Cetacean Organization	758-452-4478

Appendix 3. Papers Presented to the Workshop:

Annon. 1996. Cetacean field research conducted from Song of the Whale off Dominica and Grenada: Spring 1996. International Fund for Animal Welfare, 411 Main Street, Yarmouth Port, Mass. 02657, U.S.A.. Unpublished report, 17p.

Annon. 1999. Final Report: Sustainable development of whale watching in Samana Bay, Dominican Republic. Unpublished report, CEBSE(Center for Conservation and Eco-development of Samana Bay and its Surroundings), Inc. P.O. Box 22427, Santo Domingo, Dominican Republic.12p.

Boher, S. and Garcia, H.A. 1989. Un varamiento de ballena jorobada, Megaptera novaeangliae, el la costa continental venezolana. Informe Technico, PROFAUNA-MARNR, Caracas. 10p.

Gordon, J., Moscrop, A., carlson, C., Ingram, S., Leaper, R., and Young, K. 1997. Distribution, movements and residency of sperm whales off Dominica, Eastern Caribbean: implications for the development and regulation of the local whale watching industry. Rep. Intl. Whal. Comm. SC/49/O27. 11p.

Mitchell, E. and Reeves, R.R. 1983. Catch history, abundance, and present status of northwest Atlantic humpback whales. Rep. Intl. Whal. Commn (special issue5):153-212.

Naveira Cortizas, J.L., and Diaz, O. 1996. Primer registro de varamiento del cetaceo barbado Megaptera novaeangliae (Borowski, 1781) (Mysticeti: Balaenopteridae) para la region nororiental de Venezuela. Biol. Inst. Oceanogr. Venezuela, Univ. Oriente 35(1&2):99-104.

Rambally, J. 2000. St. Lucia Progress report on cetacean research, January 1999 to May 2000, with statistical data for the calendar year 1999. Rep. Intl. Whal. Comm., SC/52/Prog.Rep.St.Lucia. 2p.

Reeves, R.R., Clapham, P.J., Swartz, S.L., Wetmore, S., Smith, T.D. 2000. DRAFT – Historical occurrence of humpback whales in the Eastern and Southern Caribbean Sea, based on data from American whaling logbooks. Draft Report to the NOAA Fisheries, Southeast Fisheries Science Center, Miami, Florida. 21p.

Reeves, R.R., Kahn, J.A., Olsen, R.R., Swartz, S.L., Smith, T.D. 2000. DRAFT – History of whaling in Trinidad and Tobago. Draft manuscript submitted to the J. Cetacean Res. Manage. 24p.

Ryan, R.J., Bailey, M., Morris, K. and Yoshida, H. 2001. Report of sighting survey conducted in coastal waters of St. Vincent and the Grenadines, March 2000. Rep.Intl. Whal. Comm., SC/52/Prog.Rep.St.Vincent. 5p.

Stevick, P.T., Carlson, C.A., Balcomb, K.C. A note on migratory destinations of humpback whales from the eastern Caribbean. J. Cetacean Res. Manage. (3):251-254.

Swartz, S.L., Cole, T., McDonald, M.A., Hildebrand, J.A., Oleson, E.M., Burks, C., Clapham, P.J., barlow, J., and Martinez, A. 2000. Visual and acoustic survey of humpback whales (Megaptera novaeangliae) in the Eastern and Southern caribbean Sea: preliminary results. Rep. Intl. Whal. Comm. SC/52/AS23, 35p.

Ward, N. 2000. Eastern Caribbean cetacean network (ECCN) whale and dolphin sighting form. Unpublished document. ECCN, P.O. Box 573, Woods Hole, MA 02543 U.S.A.

Winn, H.E., and Winn, L.K. 1978. The song of the humpback whale in the West Indies. Mar. Biol. 47:97-114.

Appendix 4. Power Point Presentations.

Bolanos, J. "Review of the current knowledge of the status of humpback whales in the eastern Caribbean: Venezuela."

Mora-Pinto, D. "Humpback whales in Puerto Rico".

Morete, M.E. "Humpback whales from Abrolhos Bank, Brazil."

Swartz, S.L. "Historical occurrence of humpback whales in the Eastern and Southern Caribbean Sea, based on data from American whaling logbooks."

Figure 1. Location of historical catches of humpback whales based on American whaling logbooks (square symbols).